CLAIMS

What is claimed is:

1. An apparatus for capturing an image of a textured surface, comprising:

a base containing an electrical conductor interconnect structure therein;

a sensor array disposed upon the base and electrically connected to the interconnect structure, the sensor array having cells conFig.d to detect the textured surface and represent different portions of the textured surface with signals corresponding thereto; and

one or more sensor support integrated circuit devices electrically connected to the interconnect structure within the base and physically connected to the base, the at least one sensor support integrated circuit device conFig.d to address the cells of the sensor array and process the signals obtained from the sensor array.

2. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices includes a decoder to address the cells of the sensor array and further includes a comparator and an amplifier to process the signals obtained from the sensor array.

3. The apparatus according to claim 1 wherein the sensor array utilizes passive sensing cells.

4. The apparatus according to claim 1 further comprising:

a cable electrically connected to the interconnect structure, the cable conFig.d to provide power to the sensor array and the one or more sensor support integrated circuit devices, and to transmit the signals after the signals are processed within the one or more sensor support integrated circuit devices .

5. The apparatus according to claim 4 wherein the cable is electrically connected to the interconnect structure using attach pads soldered to a set of contact pads disposed on the base.

6. The apparatus according to claim 3 wherein each cell of the sensor array is conFig.d to react to a force exerted in its responsible locality, the force the result of a fingerprint feature pressed against the sensor array in the responsible locality.

7. The apparatus according to claim 6 wherein each cell comprises:

a button conFig.d to receive the force from the fingerprint feature;

a flexible mechanical structure disposed below and coupled to the button, the flexible mechanical structure deforming due to an amount of force exerted on the button; and

a contacting electrode disposed on the flexible mechanical structure, the electrode interfacing with a base contact electrode on the base, such that when the contacting electrode contacts the base contact electrode as a result of a sufficient amount of force, a current flow is caused upon application of an external voltage.

8. The apparatus according to claim 7 wherein the one or more sensor support integrated circuit devices are connected to the base using one of wire bonding and direct attach bonding methods.

9. The apparatus according to claim 7 wherein the flexible mechanical structure is a beam or a diaphragm.

10. The apparatus according to claim 1 wherein the devices are electrically connected to the interconnect structure within the base using contact pads.

11. The apparatus according to claim 1 wherein the sensor array utilizes active sensing cells.

12. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices are active CMOS devices.

13. The apparatus according to claim 1 wherein the sensor array is covered by a covering material.

14. The apparatus according to claim 13 wherein the covering material is composed of a thin-film material.

15. The apparatus according to claim 14 wherein the thin-film material is a polymer.

16. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices are covered by a bezel structure.

17. The apparatus according to claim 16 wherein the bezel structure is composed of a moldable material.

18. The apparatus according to claim 17 wherein the moldable material is a plastic.

19. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices are disposed along an edge of the sensor array.

20. The apparatus according to claim 19 wherein the sensor array is disposed on a portion of the base and the one or more sensor support integrated circuit devices are disposed on a different portion of the base.

21. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices include a first and a second device,

the first device conFig.d to address each of a plurality of columns of cells in the sensor array, and

the second device conFig.d to address each of a plurality of rows of cells in the sensor array, and process the signal obtained from each addressed cell.

22. The apparatus according to claim 21 wherein the rows of cells are disposed in a first direction and the columns of cells are disposed in a second direction perpendicular to the first direction.

23. The apparatus according to claim 22 wherein the first device is disposed along a first edge of the sensor array perpendicular to the first direction, and the second device is disposed along a second edge of the sensor array perpendicular to the second direction.

24. The apparatus according to claim 23 wherein the sensor array is disposed on a portion of the base and the first and second devices are disposed on a different portion of the base.

25. The apparatus according to claim 24 wherein the first device includes a column decoder for decoding column addresses, and wherein the second device includes a row decoder for decoding row addresses, and a comparator and an amplifier to process the signals obtained from the sensor array.

26. The apparatus according to claim 25 further comprising:

a cable electrically connected to the interconnect structure within the base, the cable conFig.d to provide power to the sensor array and the devices, and to transmit the signals after the signals are processed within the second device.

27. The apparatus according to claim 21 further comprising:

a cable electrically connected to the interconnect structure within the base, the cable conFig.d to provide power to the sensor array and the devices, and to transmit the signals after the signals are processed within the second device.

28. The apparatus according to claim 27 wherein the first device includes a column decoder for decoding column addresses, and wherein the second device includes a row decoder for decoding row addresses, and a comparator and an amplifier to process the signals obtained from the sensor array.

29. The apparatus according to claim 28 wherein the sensor array utilizes passive sensing cells.

30. The apparatus according to claim 29 wherein the first and second devices mounts are CMOS devices.

31. The apparatus according to claim 29 wherein each cell of the sensor array is conFig.d to react to a force exerted in its responsible locality, the force the result of a fingerprint feature pressed against the sensor array in the responsible locality.

32. The apparatus according to claim 31 wherein each cell comprises:

a button conFig.d to receive the force from the fingerprint feature;

a flexible mechanical structure disposed below and coupled to the button, the flexible mechanical structure deforming due to an amount of force exerted on the button; and

a contacting electrode disposed on the flexible mechanical structure, the contacting electrode interfacing with a base contact electrode on the base, such that when the contacting electrode contacts the base contact electrode as a result of a sufficient amount of force, a current flow is caused upon application of an external voltage.

33. The apparatus according to claim 21 wherein the first device includes a column decoder for decoding column addresses, and wherein the second device includes a row decoder for decoding row addresses, and a comparator and an amplifier to process the signals obtained from the sensor array.

34. The apparatus according to claim 33 wherein the rows of cells are disposed in a first direction and the columns of cells are disposed in a second direction perpendicular to the first direction.

35. The apparatus according to claim 34 wherein the first device is disposed along a first edge of the sensor array perpendicular to the first direction, and the second device is disposed along a second edge of the sensor array perpendicular to the second direction.

36. The apparatus according to claim 21 wherein the sensor array utilizes passive sensing cells.

37. The apparatus according to claim 36 wherein each cell of the sensor array is conFig.d to react to a force exerted in its responsible locality, the force the result of a fingerprint feature pressed against the sensor array in the responsible locality.

38. The apparatus according to claim 37 wherein each cell comprises:

a button conFig.d to receive the force from the fingerprint feature;

a flexible mechanical structure disposed below and coupled to the button, the flexible mechanical structure deforming due to an amount of force exerted on the button; and

a contacting electrode disposed on the flexible mechanical structure, the contacting electrode interfacing with a base contact electrode on the base, such that when the contacting electrode contacts the base contact electrode as a result of a sufficient amount of force, a current flow is caused upon application of an external voltage.

39. The apparatus according to claim 1 wherein the one or more sensor support integrated circuit devices includes a first device, the first device conFig.d to completely address each of the cells of the sensor array and process the signals obtained from the sensor array.

40. A method of manufacturing a sensing device to image a textured surface, the method comprising:

providing a sensor array that is fabricated upon a base, the base including an interconnect structure electrically connected to the sensor array, the sensor array having cells conFig.d to detect the textured surface and represent different portions of the textured surface with signals corresponding thereto; and

mounting a one or more sensor support integrated circuit devices upon the base , the at least one sensor support integrated circuit device electrically connected to the

interconnect structure and conFig.d to address the cells of the sensor array and process the signals obtained from the sensor array.

41. The method according to claim 40 wherein the mounting includes:aligning contact pads on each sensor support integrated circuit device with corresponding contact pads on the base; and

electrically connecting said contact pads on each sensor support integrated circuit device with the corresponding contact pads on the base.

42. The method according to claim 40 wherein the step of providing provides the sensor array that is fabricated using passive sensing cells.

43. The method according to claim 40 further comprising the step of:

electrically connecting a cable to the interconnect structure within the base, the cable conFig.d to provide power to the sensor array and each sensor support integrated circuit device, and to transmit the signals after the signals are processed within the one or more sensor support integrated circuit devices.

44. The method according to claim 43 wherein the step of electrically connecting the cable comprises:

soldering attach pads on the cable to contact pads disposed on the base, the contact pads electrically connected to the sensor array.

45. The method according to claim 42 wherein the step of providing includes fabricating the sensor array, and the step of fabricating the sensor array includes, for each cell of the sensor array, configuring the cell to react to a force exerted in its responsible locality, the force the result of a fingerprint feature pressed against the sensor array in the responsible locality.

46. The method according to claim 45 wherein the step of configuring comprises:

building a button conFig.d to receive force from a fingerprint feature;

building a flexible mechanical structure below and contacted to the button, the mechanical structure deforming due to an amount of force exerted on the button; and

building a contacting electrode disposed on the flexible mechanical structure, the contacting electrode interfacing with a base contacting electrode on the base, such that when the contacting electrode contacts the base contact electrode as a result of a

sufficient amount of force, a current flow is caused upon application of an external voltage.

47. The method according to claim 46 wherein each sensor support integrated circuit device is electrically connected to the base using contact pads.

48. The method according to claim 40 wherein the sensor array is built using active sensing cells.

49. The method according to claim 48 wherein the one or more sensor support integrated circuit devices include active CMOS devices .

50. The method according to claim 40 further comprising the step of covering the sensor array with a covering material.

51. The method according to claim 50 wherein the covering material is composed of a thin-film material.

52. The method according to claim 51 wherein the thin-film material is a polymer.

53. The method according to claim 40 further comprising the step of covering each sensor support integrated circuit device with a bezel structure

54. The method according to claim 53 wherein the bezel structure is composed of a moldable material.

55. The method according to claim 54 wherein the moldable material is a plastic.

56. The method according to claim 40 wherein, during the step of mounting, each sensor support integrated circuit device is disposed along an edge of the sensor array.

57. The method according to claim 56 wherein the step of mounting one or more sensor support integrated circuit devices mounts only a first device, the first device conFig.d to completely address each of the cells of the sensor array and process signals obtained from the sensing array.

58. The method according to claim 40 further comprising the step of:

electrically connecting a cable to the interconnect structure within the base, the cable conFig.d to provide power to the sensing array and the first device, and to transmit the signals that are obtained from the sensor array and processed by the first device.

59. The method according to claim 40 wherein the step of mounting one or more sensor support integrated circuit devices mounts a first and a second device, with:

the first device conFig.d to address each of a plurality of columns of cells in the sensor array, and

the second device conFig.d to address each of a plurality of rows of cells in the sensor array, and process the signal obtained from each addressed cell.

60. The method according to claim 59 wherein the step of providing provides the sensor array that is fabricated using passive sensing cells.

61. The method according to claim 59 wherein the rows of cells are disposed in a first direction and the columns of cells are disposed in a second direction perpendicular to the first direction.

62. The method according to claim 59 wherein the step of mounting mounts the sensor array on a portion of the base and the first and second devices on a different portion of the base.

63. The method according to claim 59 wherein the step of mounting mounts the first device along a first edge of the sensor array perpendicular to the first direction, and the second device along a second edge of the sensor array perpendicular to the second direction.

64. The method according to claim 63 wherein the step of mounting mounts the sensor array on a portion of the base and the first and second devices on a different portion of the base.

65. The method according to claim 59 further comprising the step of:

electrically connecting a cable to the interconnect structure within the base, the cable conFig.d to provide power to the first and second devices, and to transmit the signals obtained from the sensor array.

66. The method according to claim 65 wherein the step of providing provides the sensor array that is fabricated using passive sensing cells.

67. The method according to claim 59 wherein the flexible mechanical structure is one of a beam and a diaphragm.

68. The method according to claim 40 wherein mounting includes:

building wire bridges from the one or more sensor support integrated circuit devices to the interconnect structure within the base; and

bonding the wire bridges together thereby electrically connecting the sensor array and the devices.

69. A method of obtaining a plurality of signals representative of a textured surface applied to a fingerprint sensor, the fingerprint sensor including a base containing an electrical conductor interconnect structure therein, a sensor array disposed upon the base and electrically connected to the interconnect structure, the sensor array having cells conFig.d to detect the textured surface and represent different portions of the textured surface with signals corresponding thereto, and one or more sensor support integrated circuit devices electrically connected to the interconnect structure within the base and physically connected to the base, the at least one sensor support integrated circuit device conFig.d to address the cells of the sensor array and process the signals obtained from the sensor array, the method comprising the steps of:

receiving at the one or more sensor support integrated circuits a start signal indicating that the sensor array should be scanned to detect.

receiving at the one or more sensor support integrated circuits a clock signal that is used to successively address each cell in the sensing array, such that for each cell that is addressed, there follows the steps of:

providing a voltage to the corresponding addressed column from the one or more sensor support integrated circuits;

receiving at the one or more sensor support integrated circuits from the sensor array the signal corresponding to the detected texture for the cell on the addressed row that corresponds to the addressed column;

processing, within the one or more sensor support integrated circuits, the signal to obtain an amplified signal; and

transmitting the amplified signal from the one or more sensor support integrated circuits.

70. The method according to claim 69 wherein the one or more sensor support integrated circuit devices include a first device and a second device, wherein both the first device and the second device receive the start signal and the clock signal, wherein the first device provides the voltage, and wherein the second device processes the signal and transmits the amplified signal.